PROCEEDINGS
of the
American Society
of
Civil Engineers

2 PARTS — PART 2

Vol. 56 — SEPTEMBER, 1930 — No. 7

Our Professional Background

IN an address before the Society at the Cleveland Convention in July, W. E. Wickenden, President of Case School of Applied Science, discussed The Engineer's Professional Status. The background for this thought-compelling dissertation was sketched in a series of historical vignettes, whence the following extracts.

UNTIL the late Middle Ages engineers and architects were indistinguishable. Engineers seem first to have been recognized as a distinct profession in France. One of the earliest landmarks is the mention by Charles V, who reigned from 1364 to 1380, of "our engineers of bridges and highways" in a royal ordinance.

Three centuries later engineers had clearly attained a fairly high degree of professional consciousness, for we find them taunting the favorite architect of Louis XIV, Mansart, with the failure of a bridge which the Grand Monarch, in his enthusiasm for monumental structures, had commissioned Mansart to build. Mansart was an undoubted master of masonry construction, but was apparently quite innocent of hydraulics and the erosive action of streams.

FRENCH

The early engineers of France were public functionaries. This fact determined their status and, in time, their training as well. When Louis XV undertook to rebuild the economic structure which had been wrecked by the extravagances of his predecessor, his first aim was to restore the trade of the nation.

To this end he projected a vast system of national highways and entrusted the execution of the work to the engineer Perronnet, directing him to instruct his subordinates "in the sciences and practices needful to fulfilling with competency the different occupations relating to said bridges and highways."

Perronnet's commission held the germ of the first engineering school. Forced by the magnitude of his project to organize a corps of subordinates bound by common standards and conventions, Perronnet ingeniously transformed his office staff into a veritable school of student engineers. He divided the force into three classes, brought in professors to teach scientific subjects, and directed the men of the highest class, whom he personally supervised, to act as instructors of their juniors. In the summer, he distributed his pupils among the principal works in progress, to execute maps and plans. This was in 1747, and the essential features of his scheme remained in force for fifty years. Except for the scheme of mutual instruction, one has here the basic plan of French engineering education to this day.

Because of its strong central government France was far in advance of other European nations in the construction of public works down to the middle of the last century. After the Revolution, one of the greatest of scientific schools, the Ecole Polytechnique, was founded for the express purpose of assuring the

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St. Louis

THE program for the Fall Meeting at St. Louis is practically complete, and is substantially as outlined in these columns last month.

Those who wish to experience the many advantages which accompany attendance at Society meetings will do well to mark their calendars "Out of town October 1, 2, 3; St. Louis, Mo." After the printed programs are received in early September the registration card may be filled out and sent in, and a forwarding address selected "for emergency use only".

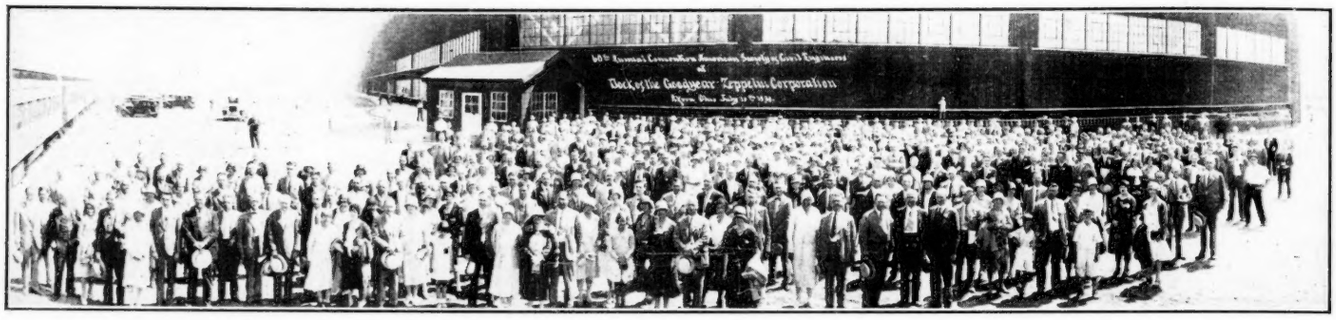
Seriously, one can scarcely afford to miss this meeting if circumstances can be moulded to permit one's attendance. The central theme concerns the interrelationship between the city and its environs. Very few of us are living in such remoteness as to be free from problems arising out of this relationship. St. Louis and its surroundings furnish an excellent example with which to demonstrate the principles and practices involved, and an important portion of the program consists in demonstration excursions in and about the city.

Besides the social aspects of these tours, there will be an all-day trip by special train to inspect the Bagnell Dam, a dance, a supper, and the usual special entertainments for the ladies.

Fall is a good time for a little relaxation, isn't it? It would seem good to meet some old friends and to make a few new ones. St. Louis is quite centrally located. How about it?

St. Louis, Mo.
Fall Meeting
October 1, 2, 3.

Am. Soc. C. E. Visitors at the Airship Dock of the Goodyear-Zeppelin Corporation, Akron, Ohio



Eclipsed

WITH the September issue, this little sheet will cease. It has been literally a little thing, but it may have served its purpose.

Part 2 was designed to introduce a medium for informal—almost conversational—distribution of some of the more interesting incidents in the life of the Society which did not seem to have a place in the more formal Proceedings, Part 1.

It intended to call attention to Society meetings with their interesting details. It tried to acknowledge with enthusiasm a few of the efforts of those members who have worked for the Society in its various phases and produced results which, more often than not, did not take the form of documents for Proceedings.

It has endeavored to provide an intimate picture of Society activities as carried on by Local Sections and by Student Chapters. It has seized the opportunity to visualize some of the process mechanism at Headquarters incident to the handling of the business of the Society.

It has occasionally published information as to the characteristics of the Society in comparison with similar or dissimilar societies which exist for the same general purpose. It has collected bits of information from the historical background of the profession, and recorded from time to time the contemporary status of our oldest members.

Some diagrams have appeared showing the growth of the Society and other pertinent data. Space has been found for the description of ingenious engineering feats or important inventions by Society members and other engineers in the past. Technical Divisions have found Part 2 a convenient medium for addressing their members. Notice has been taken of prizes and other honors granted to members.

In so far as these same features are valuable in the program of Civil Engineering, they will be continued, and much of the material formerly destined for Part 2 will be found in the new publication.

Structural Division

By Victor G. Thomassen
Chairman, Executive Committee

THE Structural Division through its committee activities has progressed rapidly in the past twelve months.

Three sub-committees of the Committee on Steel are now engaged in the study of the following topics:

- Wind Bracing in Steel Buildings
- Stresses in Structural and Machinery Parts of Movable Bridges
- Progress in Structural Alloy Steel

Two more topics have been selected for sub-committee investigation:

- Flame Cutting of Structural Steel
- Progress in Heat Treated Steel and Iron

The following topics have been selected for investigation by sub-committees of the Division Committee on Masonry and Reinforced Concrete:

- Distribution of Stresses Due to Concentrated Loads on Slabs
- Expansion Joints (volume changes)
- Admixtures to Concrete

The Division Committee on Manuals is engaged in an investigation to determine on which subjects manuals are most urgently needed.

The present program of the Division calls for the production of one report per year from each of the three main committees—the Committee on Timber, the Committee on Steel, and the Committee on Masonry and Reinforced Concrete—for presentation at Division Meetings.

The progress made so far indicates that three such reports will be available at the close of 1931.

It is expected that at least one sub-committee report will be presented at each Division Meeting together with a paper on a topic of regional interest and where possible it is planned to present those sub-committee reports which have a definite relation to the subject matter of the regional paper.

The next meeting for the Structural Division is scheduled for January, 1931, at the time of the Annual Meeting of the Society. The general subject will be "Structural Features and Wind Bracing in Tall Buildings", which should prove of striking interest in view of the tendency toward tower-like structures in our large cities.

This session will combine a sub-committee report of the Division Committee on Steel with papers on the structural features of two notable examples of recently completed tall buildings. It is hoped that this sort of program will emphasize the leading rôle played by the engineer in the field of building construction and will link the work of the Division with the important engineering achievements of the period.

Not So Much "What" as "Why"

AUGUST Proceedings, Part 1, contained a statement with respect to the Society's proposed

publication, Civil Engineering, but even at the risk of some repetition it may be well to outline here what it is intended shall be effected.

In brief, the intent is that a large proportion of the material now circulated to the membership through Proceedings will be presented in a more attractive form. The type will be larger, the leads wider, the paper opaque, photographs will be clearer. The style will be less formal, articles will be briefer, and, to a greater extent than now, timely. It will not be necessary to make studious use of the third person. One may say "In my opinion" if he wants to. The articles will be subjective as well as objective.

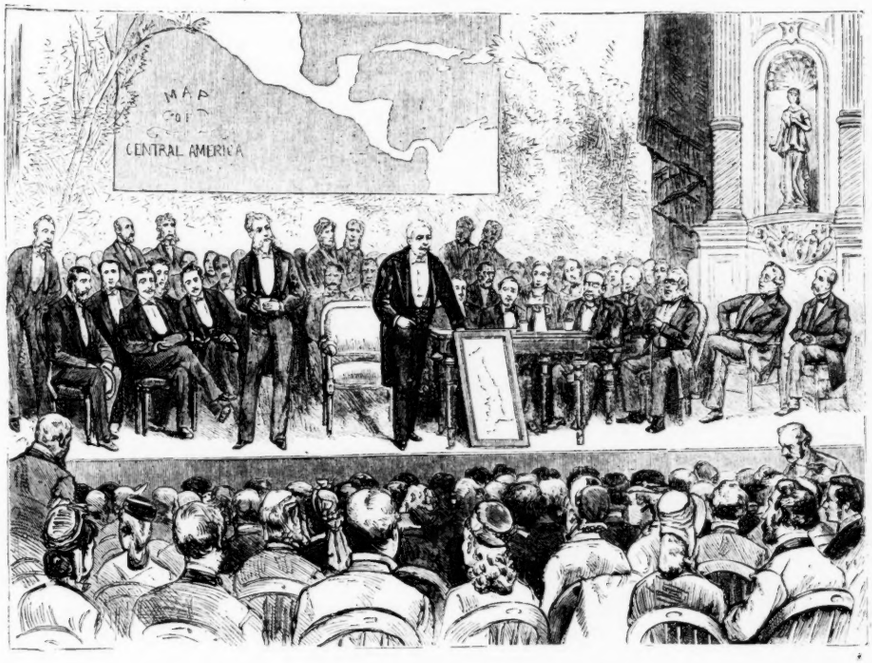
Such articles as formerly appeared in Proceedings and as lend themselves to the briefer and more flexible treatment will appear in Civil Engineering. Those articles will be selected to tell not so much what or when as why. Descriptions for the record will be subordinated to statements of the features and factors which governed or indicated the adoption of final design or method.

Civil Engineering will present, it is intended, the nub of a matter, so to speak, to those who, wishing to be informed of the major features, may not or do not find it possible to go fully into the minutiæ.

"Letters to the Editors" will be admissible, thus providing an outlet for the expression of opinion on matters technical or other than technical. Indeed, the non-technical activities of the Society will find a definite place in the new publication and the comment of the membership should be as informative as it has been in the discussions which have contributed so much to the rounding out of an idea in Proceedings.

Editorials, as that word is commonly accepted, will not appear, although committee chairmen and Society officials will be given an opportunity to discuss and report on the assignments which they are carrying out on behalf of the Society.

Whether the articles appearing in Civil Engineering will induce discussions is a moot question. It is intended that they shall be as freely and fully discussed as has been practicable in Proceedings. Whether they will or not remains to be seen. Civil Engineering is not to be a publication *prepared* for the membership, but one *made* by the membership; that is, an assemblage of contributions from the membership.



M. de Lesseps addressing American Society of Civil Engineers in New York, February 26, 1880

De Lesseps

THERE turned up in the mail the other morning a clipping from Frank Leslie's Illustrated Newspaper, dated March 13, 1880. The illustration shows us the artist's impression of Count De Lesseps speaking as a guest of the American Society of Civil Engineers in New York on February 26 of that year. The appended text describes the event.

The brilliant, vivacious and ubiquitous Vicomte De Lesseps was the guest of the American Society of Civil Engineers on the evening of the 26th ult., and in the theatre attached to the Union League Club delivered an address which for style, charm, interest and brilliancy should serve as a model for scientific lectures in general, and those in this country in particular.

In one moment M. de Lesseps was not only acquainted with his large audience, but on terms of intimacy with them. He took them into his confidence, and with that delightful *entre nous* which ever acts so talismanically when spoken at the right half-second.

M. de Lesseps spoke of the difficulties encountered in the construction of the Suez Canal, an enterprize in which nobody believed. He made historical references to fresh-water canals in the time of the Pharaohs, and jocularly recalled the edict of Philip II of Spain, who, jealous of other nations when a scheme to cut a canal at Tehuantepec was proposed, decreed that any person who should speak of an oceanic canal should be considered impious, and that the penalty would be capital punishment. M. de Lesseps hoped that this would not be his fate.

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M. de Lesseps then spoke of the surveys made by Lieutenant Bonaparte-Wyse and the first Darien exploration of Atrato Na Pipi. . . . After the vote in favor of the Panama Railroad route, M. de Lesseps said, he accepted the control of the enterprise, and to such acceptance he owed the pleasure and honor of addressing the meeting. He had been twenty-nine years in the diplomatic service with his mouth closed; now he proposed to say everything he thought. "When the vote on the canal was taken," said M. de Lesseps, "I had my wife before me as she is to-night, and she was not too well pleased, for you know that such business turns the household upside down."

In conclusion, M. de Lesseps said all were at liberty to work on the canal. His experience in the Desert was that if 2,000 persons were hired to work, 2,000 more would come to feed and amuse them. In this case, what's enough for one is enough for two. He mentioned it as singular that the negroes on the Isthmus speak the purest Castilian.

Everybody was charmed with the brilliant little vicomte, and during that too brief address he made more than one friend for the Chagres Canal.

September Proceedings

AUSTRALIA, Chile, and the United States: these are the sources for the four papers that feature the September issue of Proceedings. "Some Aspects of Water Conservation" is the title of the highly interesting paper by R. A. Sutherland, Assoc. M. Am. Soc. C. E. The author develops formulas for studying, in a preliminary manner, the merits of various storages and dam sites. Methods are also given for studying the relative economy of various types of dams.

A descriptive paper of construction work involving problems that occur outside the United States should be of considerable interest to members. W. B. Saunders, M. Am. Soc. C. E., brings Chile closer to the ken of Civil Engineers in the United States through the medium of a very readable paper entitled "Construction of La Ola Pipe Line in Chile". Unit costs of the work form a very valuable feature.

The title of the third paper, "Tests of Broad-Crested Weirs", speaks for itself. Its author, J. G. Woodburn, Assoc. M. Am. Soc. C. E. was the civil engineering Freeman Scholar for the year 1929-30. The paper gives the results of 305 tests made on broad-crested weirs of various designs in a rectangular wooden frame 2 ft. wide. An important supplement to the paper is the Appendix prepared by A. R. Webb, M. Am. Soc. C. E., in which the object was to determine, if possible, a form of weir crest which would cause the locus of critical depths to lie in a vertical plane.

B. F. Jakobsen, M. Am. Soc. C. E. presents a paper dealing with the subject of "Stresses in Gravity Dams by the Principle of Least Work". In his Synopsis Mr. Jakobsen states his belief that the stress distribution based on the Principle of Least Work will more nearly approach the true load stresses than the results obtained by the usual method.

Discussion on 18 papers by 32 contributors, the customary Society Affairs, and the list of applicants for membership, constitute the remainder of the volume. Henceforth Society Affairs and memoirs will appear only in Transactions and a limited number of preprints of each memoir will be sent out on request.

Our Professional Background

(*Continued from page* 1)

engineers of the State a lofty intellectual discipline preparatory to their technical studies. Competitive selection from the ablest youth of the country, a highly scientific training, an intensive technical training under eminent practitioners, experience in the field in vacation periods, topped off by military training in the art of command, made up as a whole an exacting professional discipline, from which the novice stepped at once into his place of responsibility.

BRITISH

The germ of British engineering came from a wholly different source. The early engineers were not public functionaries, but private constructors. Most of them, in fact, began life as workingmen and rose to prominence in the industrial revolution. Newcomen was a blacksmith; Arkwright a barber; Crampton and Hargraves were weavers; Smeaton and Watt instrument makers; and Telford a stone mason. Stephenson, father of the locomotive, had been an illiterate fireman who learned to read in an evening school. A few of them—Smeaton and Telford particularly—had the benefit of a grammer school education; most of them served a seven-year apprenticeship, but not one had a university training. Their science and art were largely self-taught under the hard régime of "work all day, study all night".

Pupilage was an individual type of apprenticeship which usually followed a grammar school education and covered a period of three to five years. The leading engineers took pupils as a legitimate source of professional income. The principal received a premium of from £100 to £500, according to his reputation and influence, and paid no compensation for any service rendered by the pupil. In return, he agreed to instruct the pupil in the arts of design and construction, to provide opportunities for observation and experience, and to use his personal influence to give the novice a favorable start at the end of his period of indenture. When, some decades later, technical schools and university chairs of engineering were established, their avowed aim was not to displace pupilage, but to supplement it with an auxiliary scientific training.

GERMAN

The Verein Deutscher Ingenieure grew out of an association of students formed in the 1840's at the old industrial academy at Berlin. This group formed a center of student life, where voluntary studies, researches, and discussions were carried on as a supplement to the formal teaching of the academy. As the graduates scattered among the industrial centers of Germany, branches were formed as meeting places and means of further education for the novices of the profession. Out of this grew the Verein.

In principle the Engineering Profession in Germany is a wholly open body. Any one who chooses may set himself up as an engineer. Competition is so intense, however, that no man has much of a chance without formal training. Actually, the recognized hall-mark of every profession is a university degree. The German degree of "diploma engineer" is in reality a State certificate of professional standing.

AMERICAN

The early decades of American engineering had a pioneer civilization as their setting. Except for a few military engineers trained abroad, mostly in France, the scattered group of land surveyors, builders of roads, canals, and bridges, and practical constructors of machinery were largely self-taught. Many men—Washington and Jefferson among them—turned their hand on occasion to engineering pursuits, but few gave them their full attention. A profession, as such, was virtually non-existent.

With the advent of the railroad, the whole course of economic history took a significant turn. Public works, manufacturing, and mining were quick to feel the stimulus of mass transportation. Westward migration, hitherto restricted to the waterways, began to open up on a vast scale. At once there arose a demand for engineers versed in relatively exact arts of location and construction. With no well-established body of practitioners, there were no roots from which the British plan of training by pupilage could develop. The engineering school arose from simple necessity.

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The organization of the American Society of Civil Engineers in 1851 gave the American profession for the first time a corporate standing.